REMARKS

Claims 1-26 are pending and at issue. The examiner has removed the previous prior rejection based on Tam and in its place issued a new grounds for rejection, an anticipation rejection based on *Mittal* (USPN 5,719,800). Applicant appreciates the examiner's review of the pending claims and consideration of the November 21, 2005 response, including the removal of the previous prior art rejections. Applicant addresses the rejections based on *Mittal* below. First, however, the finality of the office action is traversed.

PETITION TO REMOVE FINALITY

The examiner has made the office action final because, per the examiner, applicant's amendments necessitated the new grounds for rejection. The previous rejection was made final on the same grounds, and applicant successfully traversed that finality as improper. As with that previous finality indication, the current finality indication too is improper. Applicant's amendments could not have necessitated the new grounds for rejection, because the office action has levied new grounds of rejection against claims that were not amended in the last response. Both independent claims 1 and 10 stand rejected based on newly found art of the examiner, yet neither were amended in the last response. The rejection of these claims was, therefore, not precipitated by applicant's actions, but solely that of the examiner. The finality of the office action is improper. Applicants respectfully request removal of the finality.

PRIOR ART REJECTIONS

Claim 1 recites an article comprising a machine-accessible medium having stored thereon instructions that, when executed by a machine, cause the machine to:

> measure power usage on the machine;
>
> determine when a quantum of power has been used on the machine; and

> in response to the determination that a quantum of power has been used on the machine, sample state data of the machine.

The office action rejects claim 1 based on *Mittal* et al., which the office action describes as teaching the recited subject matter at col. 3, lines 4-50, which describes the measurement of activity level in a device for the purpose of throttling power consumption in the device. As *Mittal* et al., nowhere describes measuring power or determining when a particular quantum of power has been measured, instead focusing on activity level, the rejection is respectfully traversed.

Mittal does describe techniques for changing the power consumption (throttling) in an integrated circuit (IC) device. As described, *Mittal* allows an IC to dynamically adjust between the tradeoffs of high-speed operation and low-power operation, by throttling back performance of functional units when their utilization exceeds a sustainable level. Abstract. And it is this utilization that *Mittal* measures and accesses to determine if power consumption should be throttled back.

Thus to effect power throttling, *Mittal* uses activity monitors (e.g., activity monitor 106, FIG. 1) that determine whether a corresponding functional unit is active during a clock cycle. As *Mittal* states:

> Functional unit 105 provides current activity information 108 to activity monitor 106. Current activity information 108 describes what tasks or operations functional unit 105 is currently performing, or indicates that it is currently idle. *Mittal* 5:14-18

From this task or operation data, the activity monitor generates an activity level, which can be a number, a set of signals indicating the activity level is within a specified range, or single bit. *Mittal* 5:20-25. To obtain an average utilization over time, the activity monitor computes an average duty cycle of the functional unit, for example, over a preceding thousand cycles. In other words, *Mittal* describes measuring which clock cycles the unit is operating and

then averages this activity data, so that if a unit is active over a threshold number of cycles over the relevant time frame then the power consumption of that device may be adjusted as desired.

> A particularly simple monitoring technique is to use an up/down counter as an activity-level register whose contents indicate the current utilization of the functional unit being monitored. In a simple implementation, the up/down counter increments its contents by one during each clock cycle that the functional unit is active and decrements its contents by one for each clock cycle the functional unit is inactive. A slightly more complex design alternative is to increment and decrement not for each clock cycle, but rather once per each complex operation that the functional unit performs and decrement for each corresponding period that the functional unit is inactive. Another design alternative is for the activity monitor to increment by a value other then one, to decrement by a value other than one, or both. *Mittal* 6:12-37

In other words, *Mittal* does not teach measuring power usage on the machine to effect throttling, but rather measures activity utilization or whether a device is executing instructions or performing tasks instead. *Mittal*'s activity utilization information may be used in setting power policy in the device, but there is no suggestion of actually measuring power usage itself. In fact, where *Mittal* mentions monitoring the overall power consumption in an IC, *Mittal* describes measuring "substrate temperature," not actual power usage. *Mittal* 5:39-42.

Mittal's activity monitoring is a clock-cycle based analysis that, like the time-based analyses described in the background of the present application, is not a measurement of power usage. As explained, different instructions, i.e., different activities being performed by a device, may consume different amounts of power.

Further, *Mittal*'s use of time averaging over a number of duty cycles and then taking action when the activity level over the averaging period is above a certain threshold activity level would not indicate power usage.

The threshold register 306, for example, does not determine when a threshold quantum of power has been used, as the office action has suggested. The threshold register stores a value for a threshold activity level, for example, a threshold number of times a functional unit should be active over a period of time. This does not necessarily relate to power usage. For example, so long as the average utilization level stays below the threshold, then *Mittal* will not throttle power, yet it is obvious that as the machine keeps running in that sub-threshold condition, increasing amounts of total power are being consumed as time passes. The machine could consume a particular quantum of power, or many many multiples of quantums of power, and not trigger action, because the average activity level is below the threshold activity level.

Because *Mittal* does not teach or suggest measuring power usage on a machine, determining when a quantum of power has been used, or sampling state data in response to a particular quantum of power usage on that machine, *Mittal* et al. does not anticipate the recited subject matter. The rejection of claim 1 is respectfully traversed, as is the rejection of method claim 10 for like reasons.

In addition to the reasons outlined above, which inherently traverse the rejections of claims 2-9, 11-19 and 24-26, applicant also addresses some of the specific recitations from these dependent claims.

Claim 2 has been amended to recite that the article has instructions that, when executed, cause the machine to:

> provide the sampled state data to a performance analysis module;
>
> compare the sampled state data to previously sampled state data for determining a power profile based on the state data.

Mittal discusses monitoring activity data to determine when a threshold of activity has been performed over a number of clock cycles. Yet, *Mittal* does not teach or suggest sampling state data after a quantum of power

has been used and comparing that state data to previously sampled state data for developing a power profile for the machine.

Claims 11 and 12 reference measuring powered delivered and power consumed, respectively. Regarding the latter, the office action points to *Mittal*'s discussion of the activity monitor, which as outlined above, does not measure power but rather the number of cycles over which a functional unit is active. Regarding the former, units 501-505 represent functional units, activity monitors, and a power coordinator. The office action points to nothing in *Mittal* as suggesting that any of these elements measure powered delivered to a device. The functional units and activity monitors are explained above. The power coordinator takes the activity monitored data to "alter the active increments and/or decrements associated with a particular functional unit 501, thus changing that functional unit's maximum sustainable duty cycle." That is, the power coordinator acts to set how activity utilization is measured in a device and what threshold activity level is set for that device. In some example functional, the power coordinator is described as being able to throttle or disable instruction cache prefeteching based on the activity level, but there is no teaching or suggestion that the power coordinator determines power that is actually delivered to a unit. The rejections of these claims are separately traversed.

Claim 20 has been amended to further emphasize both a power measurement module for measuring power, and a power sampling module for sampling state data over multiple, i.e., at least two, power usage intervals, termed quantums. Specifically, claim 20 recites apparatus comprising:

> a power measurement module capable of measuring power usage in the apparatus and capable of determining when a quantum of power has been used; and
>
> a power sampling module coupled to the power measurement module for sampling state data of the apparatus after each of a plurality of quantums of power has been used.

Mittal does teach the recited subject, but instead, as noted above, teaches monitoring activity on the system on a time-based interval, the clock cycle, not an power-used based interval, the quantum of power. *Mittal* is a system that measures activity levels for setting power usage in a device, but *Mittal* does not teach measuring power usage itself and certainly cannot be said to sample state data each time a particular quantum of power has been used. As noted above, the threshold register stores a counter value corresponding to a threshold level of clock cycles over which a functional unit was active, not the power used by that functional unit.

For at least the foregoing reasons, the rejection of claim 20 and claims 21-23 depending therefrom are traversed.

In light of the foregoing, the applicants respectfully submit that each of the pending claims is in condition for immediate allowance. Expedited confirmation of the same is respectfully requested.

It is believed that no fee is due. However, the Commissioner is authorized to charge any fee deficiency required by this paper to Deposit Account No. 13-2855.

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Respectfully submitted,

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